

ENGLISH

Addendum valid for Emotron VFX/FDU 2.0 AC drives

Addendum to the following instruction manuals with document number:
 01-5325-01r4 for Emotron FDU 2.0 valid from software version 4.39 and
 01-5326-01r4 for Emotron VFX 2.0 valid from software version 4.39

1. New Control panel with a 4 line display

This new control panel is available in following versions:

Table 1

Part number		Designation	Description
IP54	IP20/21		
01-6520-00	01-6521-00	4 line Control panel (standard)	Including Real Time Clock-RTC
01-6520-01	01-6521-01	4 line Control panel with Bluetooth (option)	Including Real Time Clock-RTC and Bluetooth for connection with cellphone or tablet.

1.1 Control panel layout

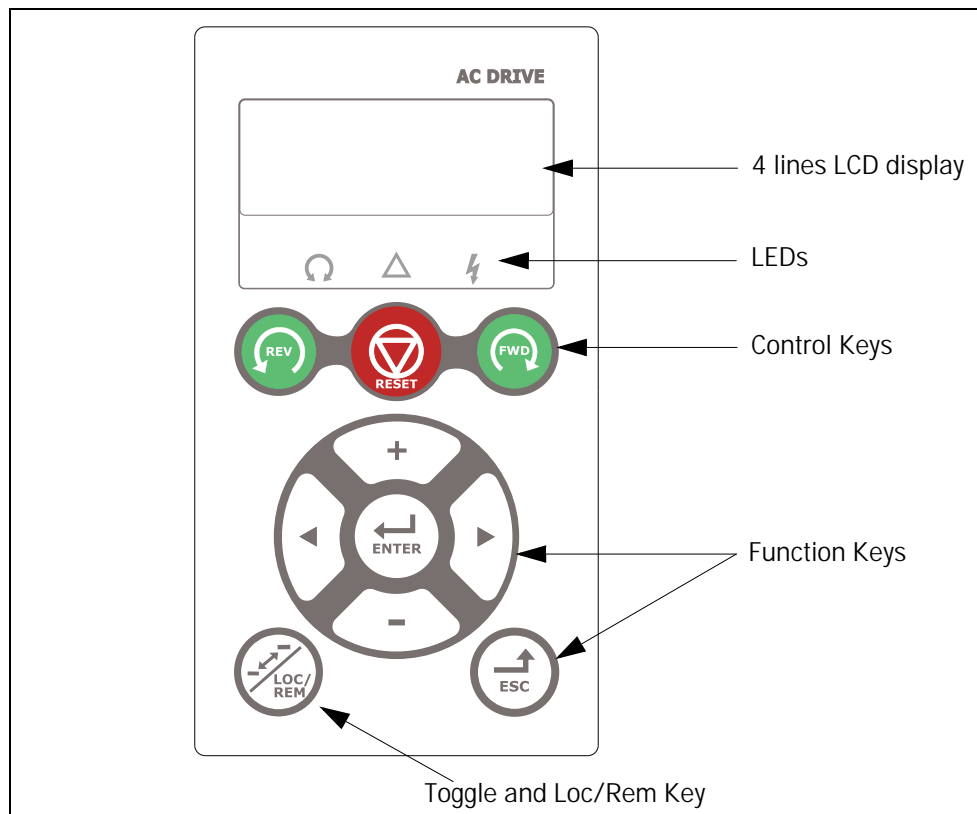


Fig. 1 Control panel with 4 lines display, LEDs and Keys.



1.2 The display

The display is back lit and consists of 4 rows, each with space for 20 characters. The display is divided into following areas. The different areas in the display are described below:

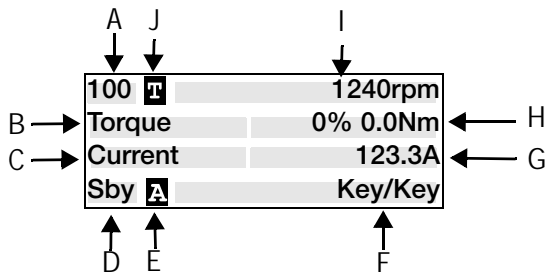


Fig. 2 The display

- Area A: Shows the actual menu number (3 or 4 digits).
- Area B: Menu name or heading (Except in menus 100+ mode), 8 characters field.
- Area C: Edit Cursor if editing or heading in menu[100], 8 characters field.
- Area D *: Shows the status of the AC drive (3 digits).
The following status indications are possible:

Digits	Description	Bit*
Stp	Motor is stopped	0
Run	Motor runs	1
Acc	Acceleration	2
Dec	Deceleration	3
Trp	Tripped	4
SST	Operating Safe Stop, is flashing when activated	5
VL	Operating at voltage limit	6
SL	Operating at speed limit	7
CL	Operating at current limit	8
TL	Operating at torque limit	9
OT	Operating at temperature limit	10
I ² t	Active I ² t protection	11
LV	Operating at low voltage	12
Sby	Operating from Standby power supply	13
LCL	Operating with low cooling liquid level	14
Slp	Sleep mode	15
SPS	Spin start active	16

*) The status shown in Area D on the control panel can be read via a fieldbus or serial communication, e.g. using Modbus address nr 30053.

It is also possible to read all status indications, not just the highest prioritized one, via a fieldbus or serial communication, e.g. using Modbus address nr 30180 and 30182. This information is also shown in EmoSoftCom PC-tool (optional) see menu “Area D stat [72B]”.

Area E: Shows active parameter set: **A**, **B**, **C**, or **D** [241].

- Area F: Active control source.
- Area G: Parameter value, shows the setting or selection in the active menu, 12 characters field.
This area is empty at the 1st level and 2nd level menu. This area also shows warnings and alarm messages. In some situations this area could indicate “+++” or “- - -” see further information in the Instruction manual.
- Area H: Signal values shown in menu [100], 12 characters field.
- Area I: Preferred read-out value (chosen in menu [110])
- Area J Shows if the menu is in the toggle loop and/or the AC drive is set for Local operation.

- = in Toggle loop
- = in Local operation and Toggle loop
- = Local operation

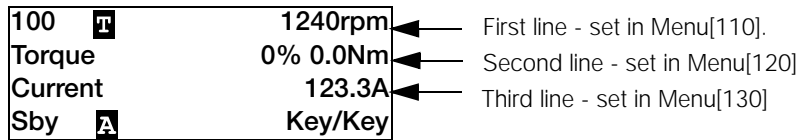
NOTE:

In area B and area C only 8 characters are available, this means that some texts will be shortened.

1.2.1 Menu [100] Preferred view

This menu is displayed at every power-up. During operation, the menu [100] will automatically be displayed when the keyboard is not operated for 5 minutes.

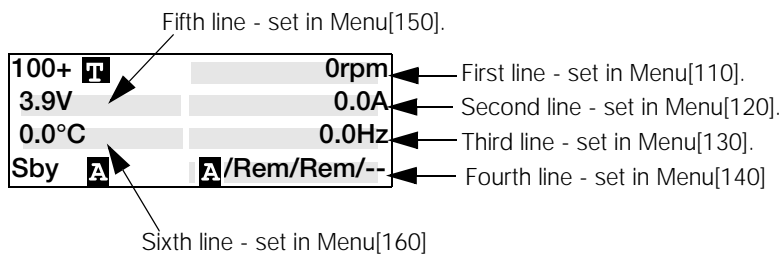
Menu “[100] Preferred View” displays the settings made in menu “[110], 1st line”, “[120], 2nd line” and “[130], 3rd line”.



Extended signal monitoring

If you hold the key (Escape) when in menu [100] following window will appear, as long as the key is pressed. Here First, Second and Third lines are shown as selected in menu [100 - 130].

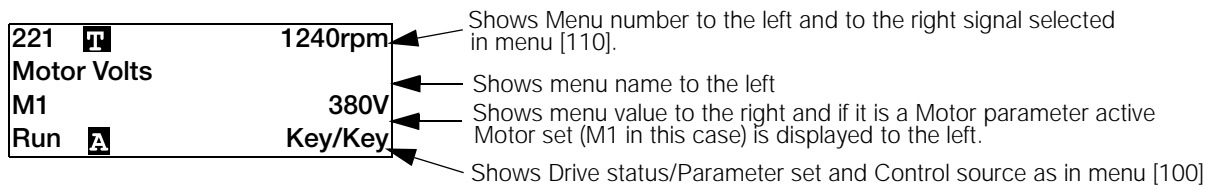
Then additional information will be displayed, selected in the menus [140], [150] and [160] according to below.



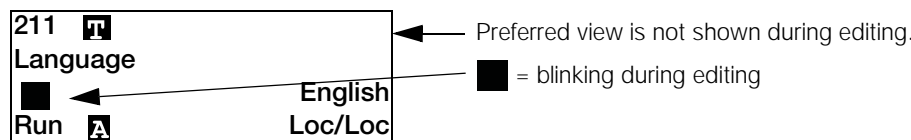
Use menu “[170] View mode” to select active type of menu [100] presentation, select if “Normal 100” or “Always 100+” (= extended signal monitoring) shall be shown at power-up. A third choice is menu “Normal[100]wo” without explaining text at second and third line.

1.2.2 Editing mode

All other menus (read and read/write menus) are used in following way.

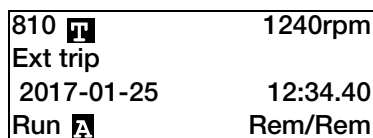


During editing, preferred view will not be displayed and the cursor will appear blinking to the left. See also below.



1.2.3 Fault logger

As real-time clock is available, line 2 will show trip/warning message and line three will show date and time when the trip condition occurred.



1.3 LED indicators

NOTE:

In chapters 1.3 to 1.4 there are no functional changes in comparison to the earlier Control panel.
The only change is the shape and colour of the keys.

The symbols on the control panel have the following functions:

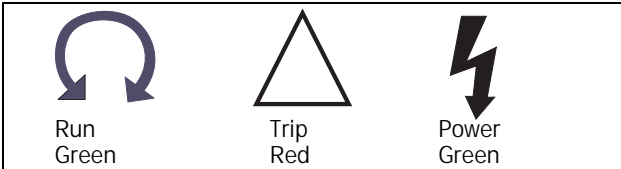


Fig. 3 LED indications

Table 2 LED indication

Symbol	Function		
	ON	FLASHING	OFF
POWER (green)	Power on	-----	Power off
TRIP (red)	AC drive tripped	Warning/Limit	No warning or trip
RUN (green)	Motor shaft rotates	Motor speed increase/decrease	Motor stopped

1.4 Control keys

The control keys are used to give the Run, Stop or Reset commands directly. As default these keys are disabled, set for remote control. Activate the control keys by selecting Keyboard in the menus “Ref Control [214]”, “Run/Stop Control [215]” and “Reset Ctrl [216]”.

If the Enable function is programmed on one of the digital inputs, this input must be active to allow Run/Stop commands from the control panel.

Table 3 Control keys

	RUN L:	gives a start with left (negative) rotation
	STOP/RESET:	stops the motor or resets the AC drive after a trip
	RUN R:	gives a start with right (positive) rotation

NOTE: It is not possible to simultaneously activate the Run/Stop commands from the keyboard and remotely from the terminal strip (terminals 1-22). Exception is the JOG-function which can give start command, see “Jog Speed [348] in the instruction manual.

1.4.1 The Toggle and Loc/Rem Key



This key has two functions: Toggle and switching between Loc/Rem function.

Press one second to use the toggle function

Press and hold the toggle key for more than five seconds to switch between Local and

Remote function, depending on the settings in [2171] and [2172].

When editing values, the toggle key can be used to change the sign of the value, see section 9.5 in the instruction manual.

1.4.2 Function keys

The function keys operate the menus and are also used for programming and read-outs of all the menu settings.

Table 4 Function keys

	ENTER key:	<ul style="list-style-type: none"> - Step to a lower menu level - Confirm a changed setting
	ESCAPE key:	<ul style="list-style-type: none"> - Step to a higher menu level - Ignore a changed setting, without confirming - Extended signal monitoring in menu [100]
	PREVIOUS key:	<ul style="list-style-type: none"> - Step to a previous menu within the same level - Go to more significant digit in edit mode
	NEXT key:	<ul style="list-style-type: none"> - Step to a next menu within the same level - Go to less significant digit in edit mode
	- key:	<ul style="list-style-type: none"> - Decrease a value - Change a selection
	+ key:	<ul style="list-style-type: none"> - Increase a value - Change a selection
	TOGGLE and LOC/REM key:	<ul style="list-style-type: none"> - Toggle between menus in the toggle loop - Switching between local and remote control - Change the sign of a value

1.5 Real Time clock

In this 4 lines Control panel (PPU) there is a built in Real time clock. This means that actual date and time will be shown at e.g. a trip condition. There is a built-in capacitor to be able to keep the clock running if the supply power is switched off.

Actual date and time will be set from factory. Date and time is shown and can be set in following menus.

1.5.1 Clock [930]

This menu group displays actual time and date, read only. Time and date are factory set to CET (Central European mean time). Adjust if required in following sub-menus.

930	1240rpm
Clock	
2017-01-23	12:34.40
Run	Key/Key

Time [931]

Actual time, displayed as HH:MM:SS. Adjustable setting.

931	1240rpm
Time	
	12:34.40
Run	Key/Key

Unit	hh:mm:ss (hours: minutes: seconds)
------	------------------------------------

Date [932]

Actual date, displayed as YYYY-MM-DD. Adjustable setting.

932	1240rpm
Date	
	2017-01-23
Run	Key/Key

Unit:	YYYY-MM-DD (year-month-day)
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Weekday [933]

Display of actual weekday, read only.

933	1240rpm
Weekday	
	Monday
Run	Key/Key



1.5.2 Clock Logic [670]

There are two Clock functions, Clock 1 and Clock 2. Each clock with separate settings for Time on, Time Off, Date on, Date Off and Weekday. These clocks can be used for activating/deactivating desired functions via Relay, digital output or Virtual I/O (For example creating sceduled start and stop commands).

Clock 1 [671]

The time, date and weekday for clock 1 are set in these submenus.

Read-only	671 Clock 1 Stp A
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Clock 1 Time On [6711]

Time when the clock 1 output signal (CLK1) is activated.

6711 Clk1TimeOn Stp A 0:00:00	
Default:	0:00:00 (hours:minutes:seconds)
Range:	0:00:00–23:59:59

Communication information

Modbus Instance no/DeviceNet no:	43600
Profibus slot/index	170/249
EtherCAT index (hex)	4e10
Profinet IO index	19984
Fieldbus format	Long, 1=1h, 1m, 1s
Modbus format	Elnt

Clock 1 Time Off [6712]

Time when the clock 1 output signal (CLK1) is deactivated.

6712 Clk1TimeOff Stp A 0:00:00	
Default:	0:00:00 (hours:minutes:seconds)
Range:	0:00:00–23:59:59

Communication information

Modbus Instance no/DeviceNet no:	43603
Profibus slot/index	170/252
EtherCAT index (hex)	4e13
Profinet IO index	19987
Fieldbus format	Long, 1=1h, 1m, 1s
Modbus format	Elnt

Clock 1 Date On [6713]

Date when the clock 1 output signal (CLK1) is activated.

6713 Clk1DateOn Stp A 2017-01-01	
Default:	2017-01-01
Range:	YYYY-MM-DD (year-month-day)

Communication information

Modbus Instance no/DeviceNet no:	43606
Profibus slot/index	171/0
EtherCAT index (hex)	4e16
Profinet IO index	19990
Fieldbus format	Long, 1=1
Modbus format	Elnt

Clock 1 Date Off [6714]

Date when the clock 1 output signal (CLK1) is deactivated. Note that if “Clk1DateOff” is set to an earlier date than “Clk1DateOn”, the result will be that the clock is not deactivated at the set date.

6714 Clk1DateOff Stp A 2017-01-01	
Default:	2017-01-01
Range:	YYYY-MM-DD

Communication information

Modbus Instance no/DeviceNet no:	43609
Profibus slot/index	171/3
EtherCAT index (hex)	4e19
Profinet IO index	19993
Fieldbus format	Long, 1=1
Modbus format	Elnt

Clock 1 Weekday [6715]

Weekdays when the clock function is active. Having entered the editing mode, select or unselect the desired weekdays with the cursor using the PREV and NEXT keys on the control panel. Confirm by pressing ENTER. Exit the editing mode and the activated weekdays will be viewed in



the menu display. The deactivated weekdays are replaced by a dash mark “-” (e.g. “MTWTF - -”).

6715 Clk1Weekday Stp A MTWTFSS	
Default:	MTWTFSS (all activated)
Range:	Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday.

Communication information

Modbus Instance no/DeviceNet no:	43612
Profibus slot/index	171/6
EtherCAT index (hex)	4e1c
Profinet IO index	19996
Fieldbus format	UInt, 1=1
Modbus format	UInt

NOTE: Please make sure that the correct time and date settings are done for the real time clock, menu group [930] “Clock”.

1.6 Bluetooth (Optional) device ID number

To connect to the mobile App “EmoPPU” (Android & IOS Appstores) you need a PPU unit with Bluetooth communication (optional see Table 1, page 1). For establishing communication between PPU and App please use the unique Bluetooth ID number in AC drive menu “[924] Bluetooth ID”.

Bluetooth ID [924]

Unique ID number for connecting to “EmoPPU” app.

924 Bluetooth ID Stp 123456	
Default:	No characters shown

Communication information

Modbus Instance no/DeviceNet no:	42620
Profibus slot/index	167/34
EtherCAT index (hex)	4a3c
Profinet IO index	19004
Fieldbus format	UInt, 1=1
Modbus format	UInt

2. Added functionality

2.1 Two standard softwares

To meet the demand of having more available languages we have divided the languages into two Language sets. Explained in chapter “1.4 Type code number” in the table at position 16 - Software, see also below.

Position	Configuration	
16	Software type	A= Standard software (Language set 1) I= Std sw Language set 2 See menu “Language [211]” below.

Language [211]

Select the language used on the LC Display. Once the language is set, this selection will not be affected by the Load Default command.

There are two software sets with different languages available for delivery. “Standard software with Language set 1” and the optional “Standard software with Language set 2”, see table below.

211		Language	Language set	
Default:		English	Set 1	Set 2
English	0	English selected	X	X
Svenska	1	Swedish selected	X	-
Nederlands	2	Dutch selected	X	-
Deutsch	3	German selected	X	X
Français	4	French selected	X	-
Español	5	Spanish selected	X	-
Русский	6	Russian selected	X	-
Italiano	7	Italian selected	X	-
Cesky	8	Czech selected	-	X
Turkish	9	Turkish selected	-	X

Communication information

Modbus Instance no/DeviceNet no:	43011
Profibus slot/index	168/170
EtherCAT index (hex)	4bc3
Profinet IO index	19395
Fieldbus format	UInt
Modbus format	UInt



2.2 Additional motor parameters for PMSM motors

PMSM data [22J]

Additional motor parameters for Permanent Magnet Synchronous Motors (PMSM).

This menu is only available if PMSM is selected in menu [22I].

Motor BEMF [22J1]

Set the back EMF of the motor at the nominal operating point. This parameter may not be explicitly available from the manufacturer, but can then be computed from the electrical constant K_e and the nominal speed.

22J1 BEMF	
Default:	Motor dependent
Range:	100-700 V
Resolution	1 V

Communication information

Modbus Instance no/DeviceNet no:	43391
Profibus slot/index	170/40
EtherCAT index (hex)	4d3f
Profinet IO index	19775
Fieldbus format	Long, 1=0.1
Modbus format	EInt

Rs (Ω /ph) [22J2]

Set the per phase stator resistance..

22J2 Rs (Ω /ph)	
Default:	Undef
Undef	Undefined
Range:	0.000001-40.000000 ohm

Communication information

Modbus Instance no/DeviceNet no:	43392
Profibus slot/index	170/41
EtherCAT index (hex)	4d40
Profinet IO index	19776L
Fieldbus format	Long, 1=0.00001
Modbus format	EInt

Lsd (mH/ph) [22J3]

Set the per phase d-axis stator inductance.

22J3 Lsd (mH/ph)	
Default:	Undef
Undef	Undefined
Range:	0.001-10000.000 mH

Communication information

Modbus Instance no/DeviceNet no:	43393
Profibus slot/index	170/42
EtherCAT index (hex)	4d41
Profinet IO index	19777
Fieldbus format	Long, 1=0.001
Modbus format	EInt

Lsq (mH/ph) [22J4]

Set the per phase q-axis stator inductance.

22J4 Lsq (mH/ph)	
Default:	Undef
Undef	Undefined
Range:	0.001-10000.000 mH

Communication information

Modbus Instance no/DeviceNet no:	43394
Profibus slot/index	170/43
EtherCAT index (hex)	4d42
Profinet IO index	19778
Fieldbus format	Long, 1=0.001
Modbus format	EInt



2.3 PTC/PT100 option boards

Now possible to mount two PTC/PT100 option boards.

PT100 Inputs [236]

Sets which of PT100 inputs that should be used for thermal protection. Deselecting not used PT100 inputs on the PTC/PT100 option board in order to ignore those inputs, i.e. extra external wiring is not needed if port is not used.

236		PT100 Inputs
Default:		PT100 1+2+3
Selection:		PT100 1, PT100 2, PT100 1+2, PT100 3, PT100 1+3, PT100 2+3, PT100 1+2+3, PT100 1-4, PT100 1-5, PT100 1-6
PT100 1	1	Channel 1 used for PT100 protection
PT100 2	2	Channel 2 used for PT100 protection
PT100 1+2	3	Channel 1+2 used for PT100 protection
PT100 3	4	Channel 3 used for PT100 protection
PT100 1+3	5	Channel 1+3 used for PT100 protection
PT100 2+3	6	Channel 2+3 used for PT100 protection
PT100 1+2+3	7	Channel 1+2+3 used for PT100 protection
PT100 1-4	8	Channel 1 - 4 used for PT100 protection
PT100 1-5	9	Channel 1 - 5 used for PT100 protection
PT100 1-6	10	Channel 1 - 6 used for PT100 protection

2.4 Added brake functionality on Emotron VFX

DC Hold [33J]

This function makes it possible to apply a DC-voltage to the motor at zero speed. This provides a (low) holding torque. This function is only available in speed mode in Emotron VFX.

DC Hold [33J1]

Enabling of DC hold functionality.

33J1		DC Hold
Default:		Off
Off	0	
On	1	

Communication information

Modbus Instance no/DeviceNet no:	43148
Profibus slot/index	169/52
EtherCAT index (hex)	4c4c
Profinet IO index	19532
Fieldbus format	UInt
Modbus format	UInt

DC Holding Speed [33J2]

Select the speed at which DC hold is released / enabled. DC hold is activated if both the speed and the speed reference is below this value.

33J2		DC Hold Spd
Default:		10 U/rpm
Range:		0 - 250 rpm

Communication information

Modbus Instance no/DeviceNet no:	43149
Profibus slot/index	169/53
EtherCAT index (hex)	4c4d
Profinet IO index	19533
Fieldbus format	UInt, 1=1
Modbus format	UInt

DC Holding Current [33J3]

Select the applied DC hold current in percent of nominal motor current.

33J3		DC Hold Cur
Default:		30 %
Range:		0 - 100 %

Communication information

Modbus Instance no/DeviceNet no:	43150
Profibus slot/index	169/54
EtherCAT index (hex)	4c4e
Profinet IO index	19534
Fieldbus format	UInt, 1=1
Modbus format	UInt

